

# Claims

- [c1] 1. An apparatus for recording, storing, updating, and retrieving operating, maintenance and repair information relating to individual components of turbine engines, said apparatus comprising at least one information storage device permanently deployed on at least one individual engine component further comprising:
- a) identification information about at least one part of the engine component stored thereon;
  - b) at least one data register having data storage capability, said data register referenced by stored identification information of at least one part and a parameter recorded by said data register;
- wherein said information storage device is accessible for at least one of the following:
- i) recording and storing maintenance work done when the engine component undergoes maintenance;
  - ii) updating said information storage device when a part is exchanged for a replacement part;
  - iii) retrieving recorded and stored information in said information storage device under certain selected conditions.

- [c2] 2. The apparatus of Claim 1 wherein information in said data register is updated by an engine control system.
- [c3] 3. The apparatus of Claim 1 wherein information in said data register is stored in said information storage device periodically at certain selected times.
- [c4] 4. The apparatus of Claim 1 wherein information in said data register is stored and updated in said information storage device each time the engine is stopped.
- [c5] 5. The apparatus of Claim 1 wherein information can only be added to said information storage device.
- [c6] 6. The apparatus of Claim 1 wherein said information storage device is capable of storing information over the operating life of an engine component.
- [c7] 7. The apparatus of Claim 6 wherein the stored information from each data register is permanent.
- [c8] 8. The apparatus of Claim 7 wherein stored information remains with the engine component for the life of the engine component.
- [c9] 9. The apparatus of Claim 1 wherein said information storage device is made an integral part of individual engine components.

- [c10] 10. The apparatus of Claim 1 wherein a plurality of said information storage devices is permanently mounted on a plurality of engine components.
- [c11] 11. The apparatus of Claim 10 wherein a plurality of said information storage devices on a plurality of engine components is polled to predict future maintenance requirements of the engine.
- [c12] 12. The apparatus of Claim 1 wherein anti-tampering devices prevent tampering with the data contents of said information storage device.
- [c13] 13. The apparatus of Claim 1 wherein maintenance activity must be recorded in said information storage device when maintenance is done for the engine to operate.
- [c14] 14. The apparatus of Claim 1 wherein the information recorded in said information storage device is provided by circuitry on board an engine.
- [c15] 15. The apparatus of Claim 1 wherein the information recorded in said information storage device is provided by circuitry external to said engine component.
- [c16] 16. The apparatus of Claim 1 wherein information is supplied to said information storage device from a remote location.

- [c17] 17. The apparatus of Claim 1 wherein at least one of the following:
- a) recorded information
  - b) stored information
- in said information storage device is retrieved from a remote location.
- [c18] 18. The apparatus of Claim 1 wherein at least one of the following:
- a) recorded information
  - b) stored information
- in said information storage device is used to predict future maintenance requirements of at least one engine component.
- [c19] 19. The apparatus of Claim 1 wherein said information storage device is queried to ensure that contractual requirements are met.
- [c20] 20. An apparatus for electronically recording, storing, updating, and retrieving operating, repair, and maintenance information relating to individual components of gas turbine engines comprising at least one information storage device permanently deployed on at least one individual engine component further comprising:
- a) identification information of at least one life limited

part of the engine component stored thereon;

b) at least one data register having data storage capability for life limited parts, said data register referenced by stored identification numbers of at least one life limited part and a parameter recorded by said data register; wherein said information storage device is accessible for at least one of the following:

i) recording and storing maintenance work done when the engine component undergoes maintenance;

ii) updating said information storage device with identification information of replacement life limited parts and appropriate settings for at least one data register when a life limited part is changed;

iii) retrieving recorded and stored information in said information storage device under certain selected conditions.

[c21] 21. The apparatus of Claim 20 wherein stored information remains in said information storage device on the engine component permanently.

[c22] 22. The apparatus of Claim 20 wherein information in at least one data register is stored in a storage area in said information storage device periodically.

[c23] 23. The apparatus of Claim 22 wherein information in at least one data register is stored in said information stor-

age device each time the engine is stopped.

- [c24] 24. A method for recording, storing, updating and re-retrieving operating and maintenance information relating to an individual component of a turbine engine comprising the steps of:
- a) providing at least one information storage device permanently deployed on at least one individual engine component;
  - b) storing identification information about at least one part of the individual engine component in the information storage device;
  - c) providing at least one data register in the information storage device having data storage capability;
  - d) referencing each data register with stored identification information of at least one part and a parameter recorded by each data register;
  - e) operating the engine and recording operating parameter data in at least one data register; and
  - f) at least one of the following:
    - i) storing maintenance work done when the engine component undergoes maintenance;
    - ii) updating the information storage device when a part is exchanged for a replacement part;
    - iii) retrieving recorded and stored information from the information storage device under certain selectable con-

ditions.

- [c25] 25. The method of Claim 24 comprising periodically storing information from at least one data register in a storage area of the information storage device at certain selectable times.
- [c26] 26. The method of Claim 25 comprising storing information from at least one data register in the information storage device each time the engine is stopped.
- [c27] 27. A method for electronically recording, storing, updating and retrieving operating and maintenance information relating to an individual component of a gas turbine engine comprising the steps of:
- a) providing at least one information storage device permanently deployed on at least one individual engine component;
  - b) storing identification information about at least one life limited part of the individual engine component in the information storage device;
  - c) providing at least one data register in the information storage device having data storage capability to record data parameters being measured and place them in a storage area of the information storage device;
  - d) referencing each data register with stored identification information of at least one life limited part and a

parameter recorded by each data register;  
e) operating the engine and recording operating parameter data in at least one data register; and  
f) at least one of the following:  
i) storing maintenance work done when the engine component undergoes maintenance;  
ii) updating the information storage device when a part is exchanged for a replacement part;  
iii) retrieving recorded and stored information from the information storage device under certain selectable conditions.

[c28] 28. The method of Claim 27 comprising periodically storing information from at least one data register in a storage area in the information storage device at certain selectable times.

[c29] 29. The method of Claim 27 comprising keeping stored information in the information storage device on the engine component for the life of the engine component.